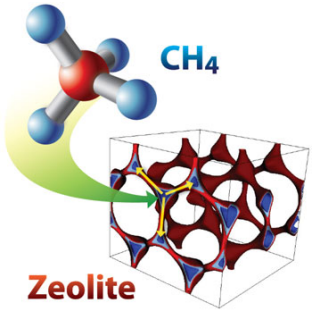
LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, April 15-19, 2013.

NATURE WORLD NEWS

WHAT A GAS



The metal zeolite may be optimal for trapping methane.

Lawrence Livermore researchers have discovered a material -- zeolite -- that can trap methane, a greenhouse gas associated with rising global temperatures.

Methane is the second most prevalent greenhouse gas. Although methane's lifetime is shorter than carbon dioxide, it can trap more heat. Major sources of methane include natural gas and petroleum systems, wastewater treatments, agriculture and coal mining.

"Methane capture poses a challenge that can only be addressed through extensive material screening and ingenious molecular-level designs," said lead LLNL researcher Amitesh Maiti.

To read more, go to *Nature World News*.

HPCwire

IT'S CLASSIFIED

The Sequoia supercomputer.

Lawrence Livermore's Sequoia supercomputer has gone classified.

It has completed its transition to classified computing in support of the Stockpile Stewardship Program, which helps the United States ensure the safety, security and effectiveness of its aging nuclear weapons stockpile in the absence of underground testing.

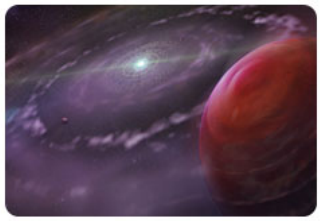
The 20-petaflop (quadrillion floating point operations per second) IBM BlueGene/Q system is dedicated exclusively to the National Nuclear Security Administration's Advanced Simulation and Computing (ASC) program. ASC is a tri-lab effort drawing on the computational engineering and scientific computing expertise at Los Alamos, Sandia and Lawrence Livermore national laboratories.

Delivered and deployed in early 2012, the 96-rack Sequoia machine not only took the No. 1 ranking on the June 2012 Top500 list of the world's most powerful supercomputers, it also was rated as the world's most energy efficient system and earned top honors on the Graph500 list for its ability to solve big data problems -- finding the proverbial needle in the haystack. While Sequoia dropped to No. 2 on the November 2012 Top500 list, it remains one of the most energy efficient HPC systems and retained its No. 1 Graph500 ranking.

To read more, go to *HPC Wire*.

THE DAILY GALAXY

SNAPSHOT OF A FARAWAY PLANET



Artist's rendering of the planetary system HR 8799 at an early stage in its evolution. Image courtesy of Dunlap Institute for Astronomy & Astrophysics; Mediafarm.

A team of international scientists including a Lawrence Livermore National Laboratory astrophysicist has made the most detailed examination yet of the atmosphere of a Jupiter-size planet beyond our solar system.

"This is the sharpest spectrum ever obtained of an extrasolar planet," said Bruce Macintosh, an astronomer at LLNL. "This shows the power of directly imaging a planetary system -- the exquisite resolution afforded by these new observations has allowed us to really begin to probe planet formation."

Although the planet does have water vapor, it's incredibly hostile to life -- like Jupiter, it has no solid surface, and it has a temperature of more than a 1,000 degrees Fahrenheit as it glows with the energy of its original formation. Still, this discovery provides clues as to the possibility of other Earthlike planets in other solar systems.

To read more, go to *Daily Galaxy*.

PACIFIC MARITIME
Marine Business for the Operations Sector MAGAZINE

A SAFER PORT OF ENTRY

The Laboratory is looking at ways to address port safety and security. The issues facing the maritime industry are numerous: containerization of freight, transition of the international shipping fleet, labor relations, threats of terrorism, landlocked ports vs. expansion pressures, environmental impacts and costs of dredging and much more.

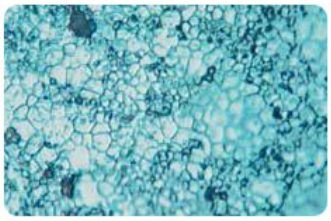
Taken together, these issues have prompted Lawrence Livermore National Laboratory to initiate the Portunus Project.

The Laboratory, known for its role in national security research and technology development, recently presented the Portunus Project at the California Maritime Leadership Conference.

The Portunus Project is a security research project that looks into various technologies and mechanisms to provide an offshore inspection of seaborne trade and private craft as one of many strategies to address the threat of terrorism.

To read more, go to *Pacific Maritime Magazine*.

SLEUTHING THE PATH OF NUCLEAR MATERIALS



The microscopic shape and size of uranium particles offer clues about the material's origin. This optical image of a nuclear fuel pellet shows the morphology of the grains.

The threat of nuclear weapons is of big concern to the United States and other countries around the world, as evidenced by North Korea's announcement that it will expand its arsenal.

For the past 20 years, the United States has been trying to identify and protect plutonium and uranium all over the globe by determining:

- Who has plutonium, and enriched uranium?
- Who's trying to steal it?
- Who's buying it?
- If it's enough to make any weapons?

Lawrence Livermore National Laboratory's Mike Kristo has studied nuclear materials seized in Europe and the Russian Federation in the early 1990s.

"The interdicted materials came to us through a variety of means, U.S. government agencies, State Department for example, law enforcement agencies," Kristo said. Typically these are arrangements made in concert with other countries."

To read more, go to WVXU.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send e-mail.